

Baltimore City Department of Public Works

FY 2022 Capital Improvement Program Presentation, Bureau of Water & Wastewater

January 14, 2021



Department of Public Works

Mission

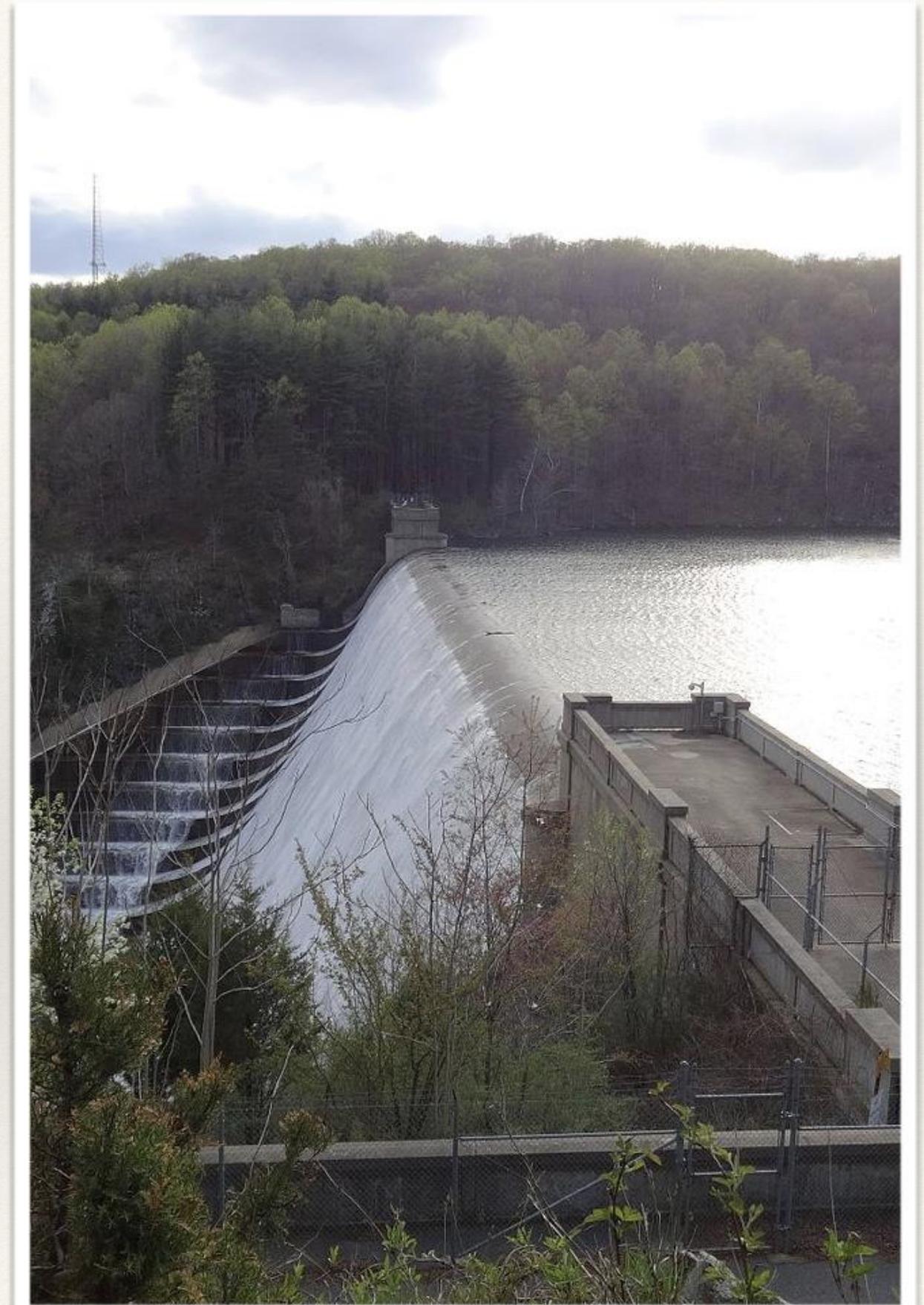
We support the health, environment, and economy of our City and the region by providing customers with safe drinking water and keeping neighborhoods and waterways clean.



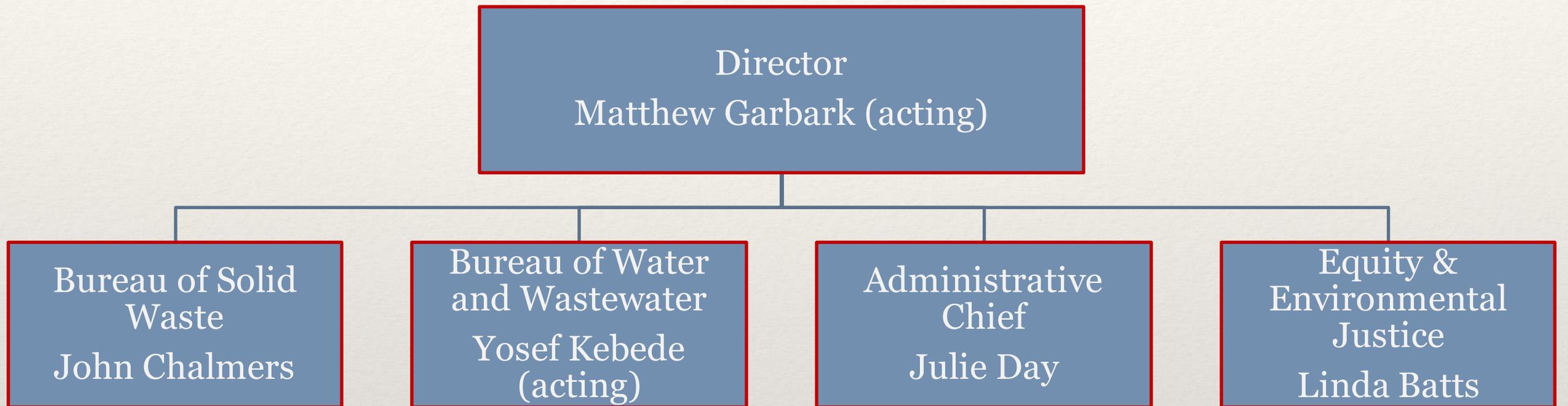
Department of Public Works

Vision

To be a strong proponent and protector of our environment and the health and vitality of our communities.

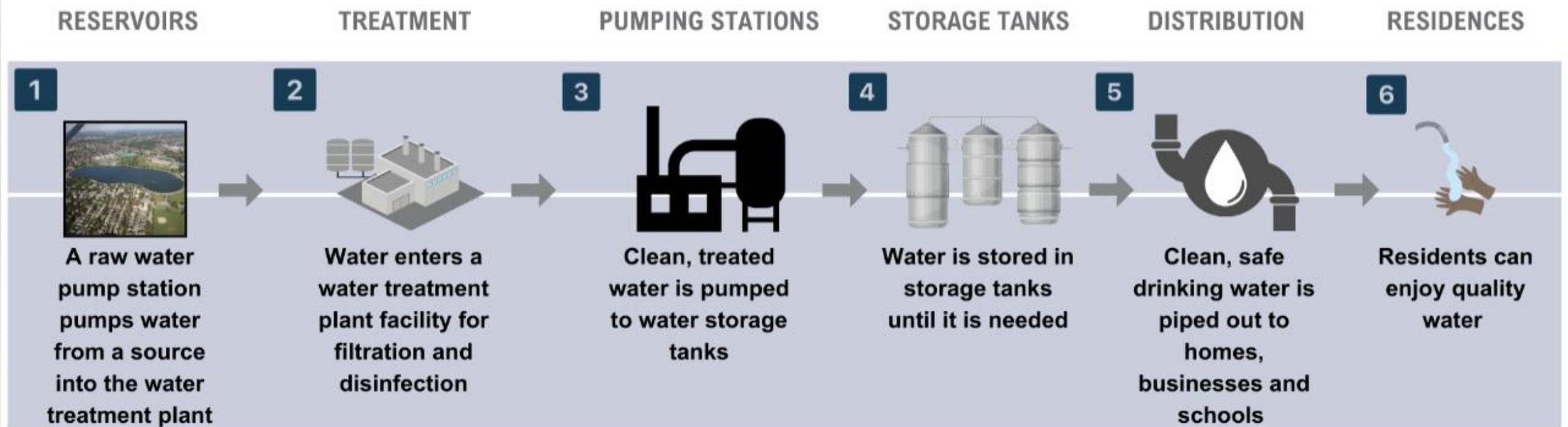


Office of the Director - Organizational Chart



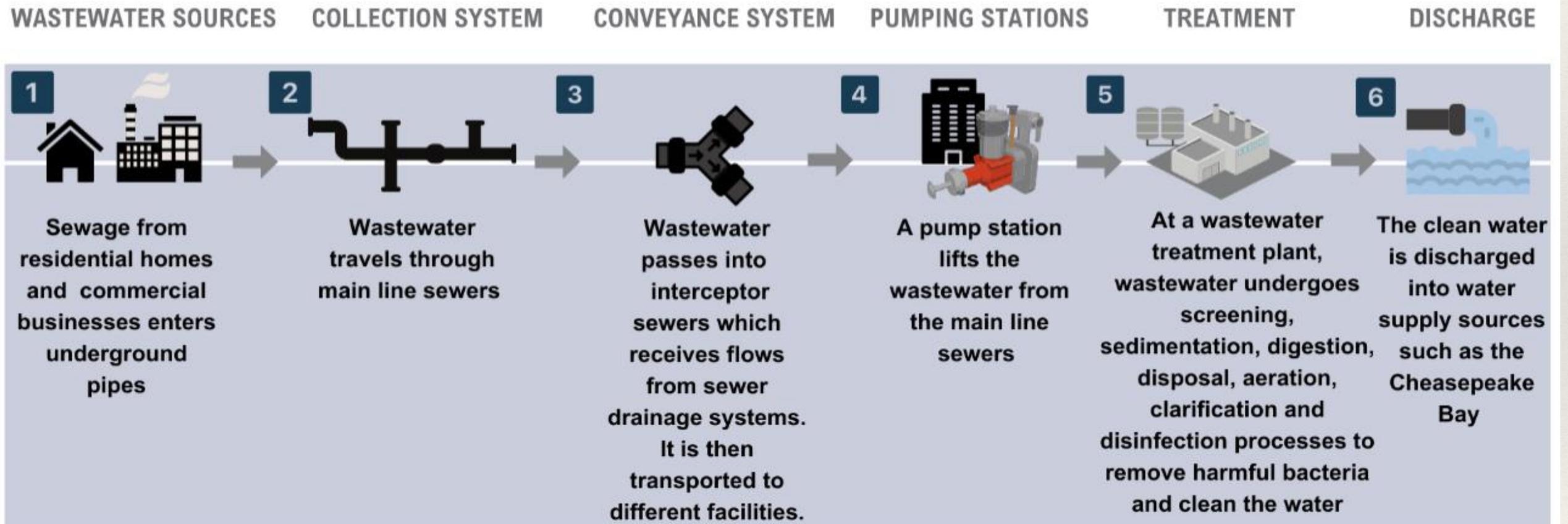
Drinking Water System

Baltimore City Drinking Water System

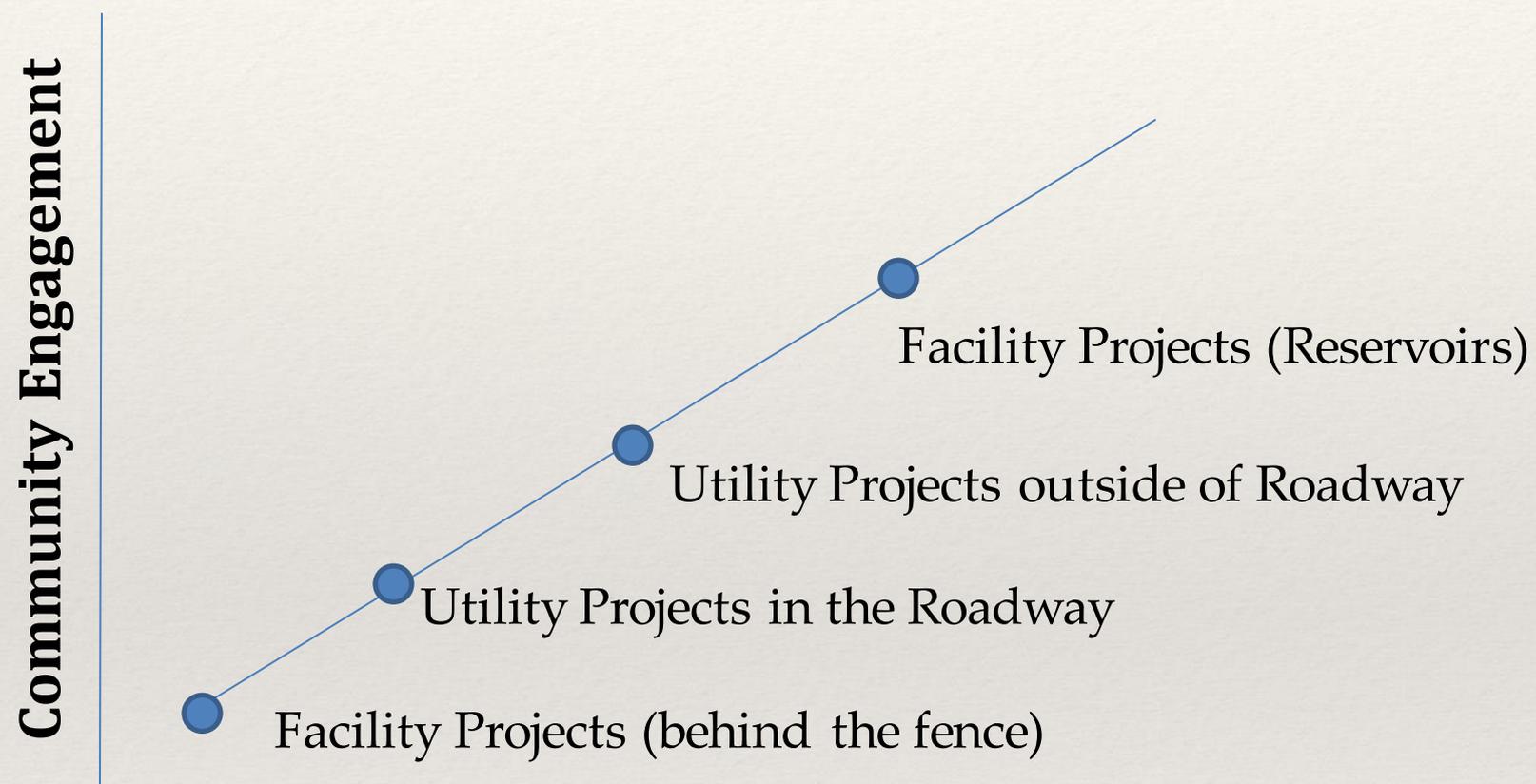


Wastewater Treatment System

Baltimore City Wastewater Treatment System



OEC Community Engagement



Impact to Community During and After Construction



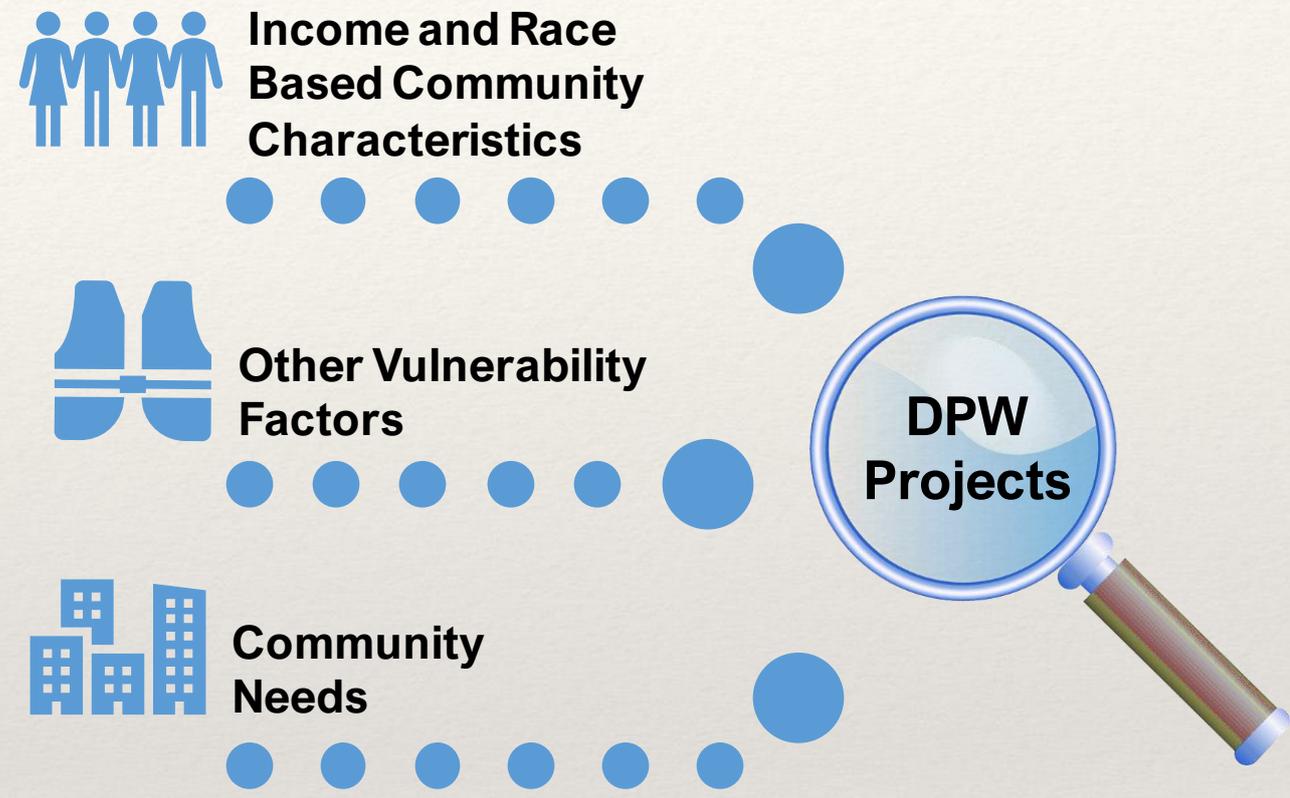
DPW's Routine Community Engagement

- DPW in the Community Meetings
- Consent Decree Annual Meeting
- Staff Dedicated to Routine Engagement and Outreach
- Programs
- Events
- Publications
- Social Media



Objectives

- 1. Improve Visibility and Impact of Equity in DPW Decision-Making**
 Develop an 'Equity Lens' for projects and CIP Project Bundles that highlight how Equity has been incorporated and considered. Increase the Role of Equity in scoring projects.
- 2. Make Equity Considerations More Comprehensive**
 Bake-In Equity in all social, environmental, economic, and operational criteria and incorporate co-benefits for disadvantaged communities.
- 3. Improve Equity Analysis and Insights**
 Incorporate a data-driven methodology that more accurately captures spatial and demographic context for projects and impacts.

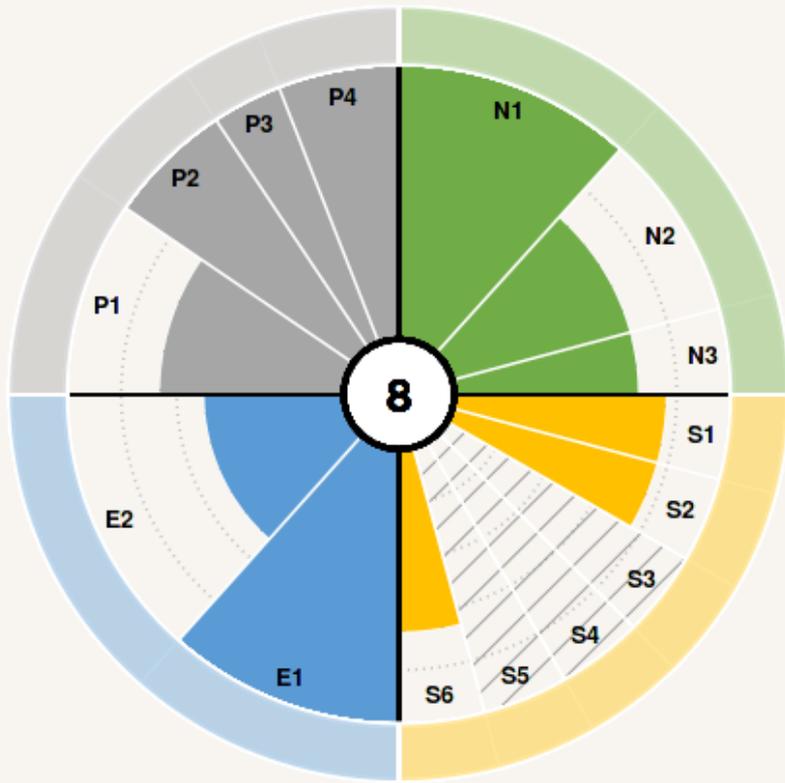


Data Sources – 1) US Census;
 2) US EPA EJScreen;
 3) Baltimore Neighborhood Indicators Alliance (BNIA) Vital Signs Report

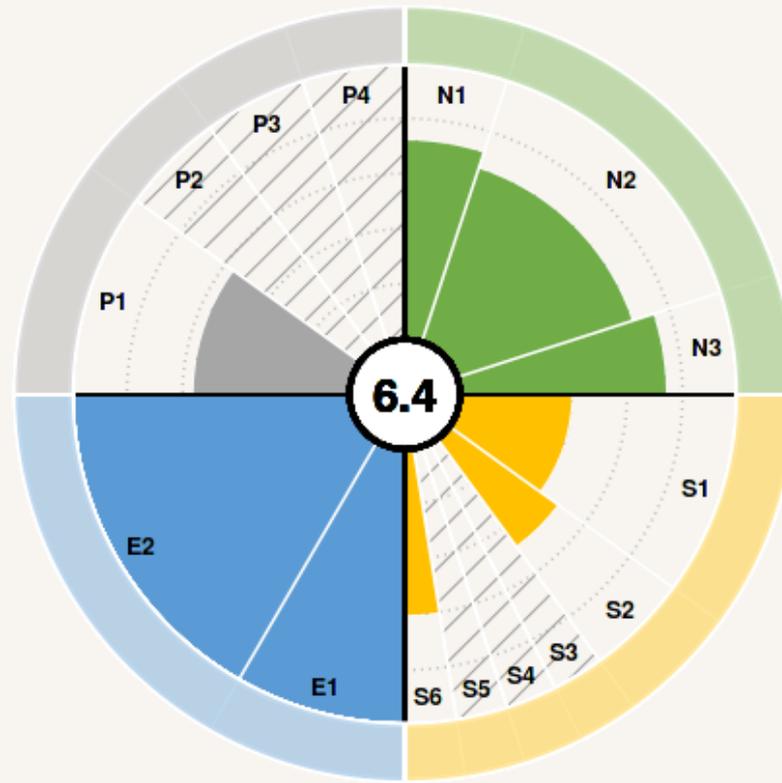


The Three Lens Scorecard

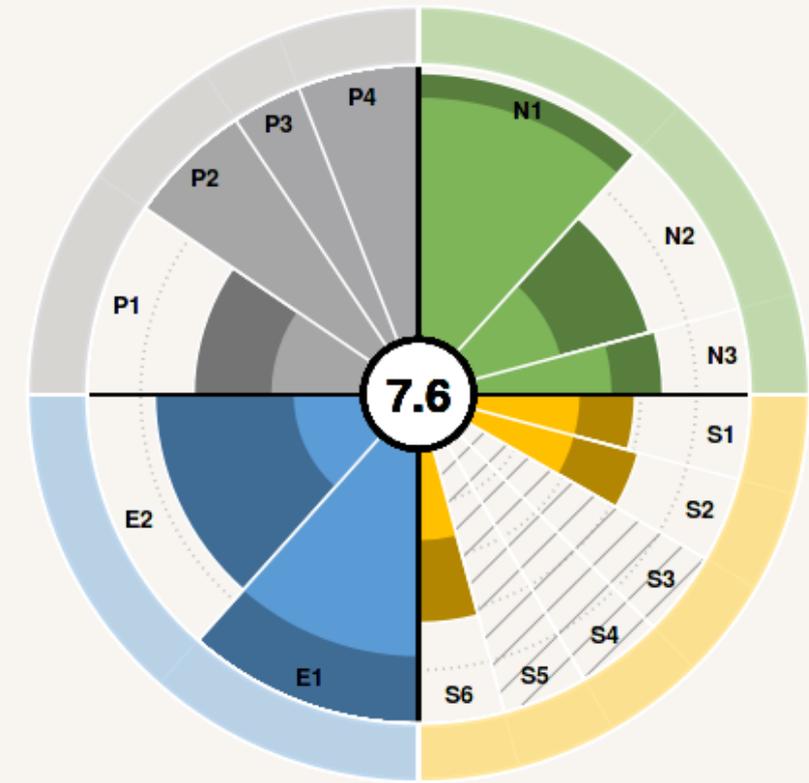
PERFORMANCE LENS



EQUITY LENS



COMBINED LENS



ENVIRONMENTAL

| | |
|----|----------------------------|
| N1 | Regulatory Driven Projects |
| N2 | Sewage Overflows |
| N3 | Surface Water Quality |

SOCIAL

| | |
|----|-------------------------|
| S1 | Health and Safety |
| S2 | Improve Quality of Life |
| S3 | Drinking Water Quality |
| S4 | Potable Water Leakage |
| S5 | Drinking Water Service |
| S6 | Customer Satisfaction |

ECONOMIC

| | |
|----|----------------------------|
| E1 | Alternative Funding Source |
| E2 | Economic Benefit |

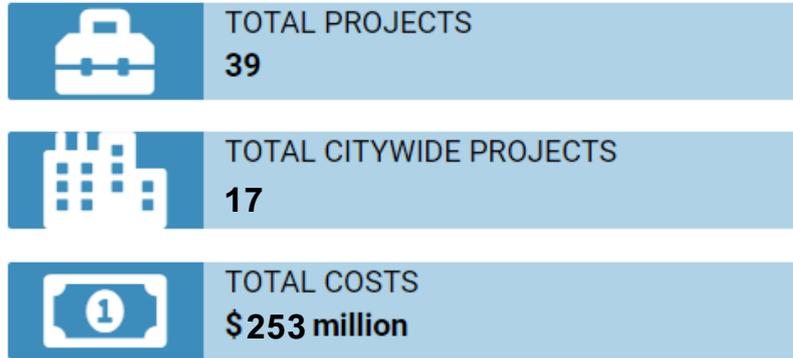
PROJECT IMPLEMENTATION

| | |
|----|---|
| P1 | Service Life and Consequence of Failure |
| P2 | Better Performance of System |
| P3 | Time Component |
| P4 | Systems Impact |



DPW CIP Program Summary FY-22

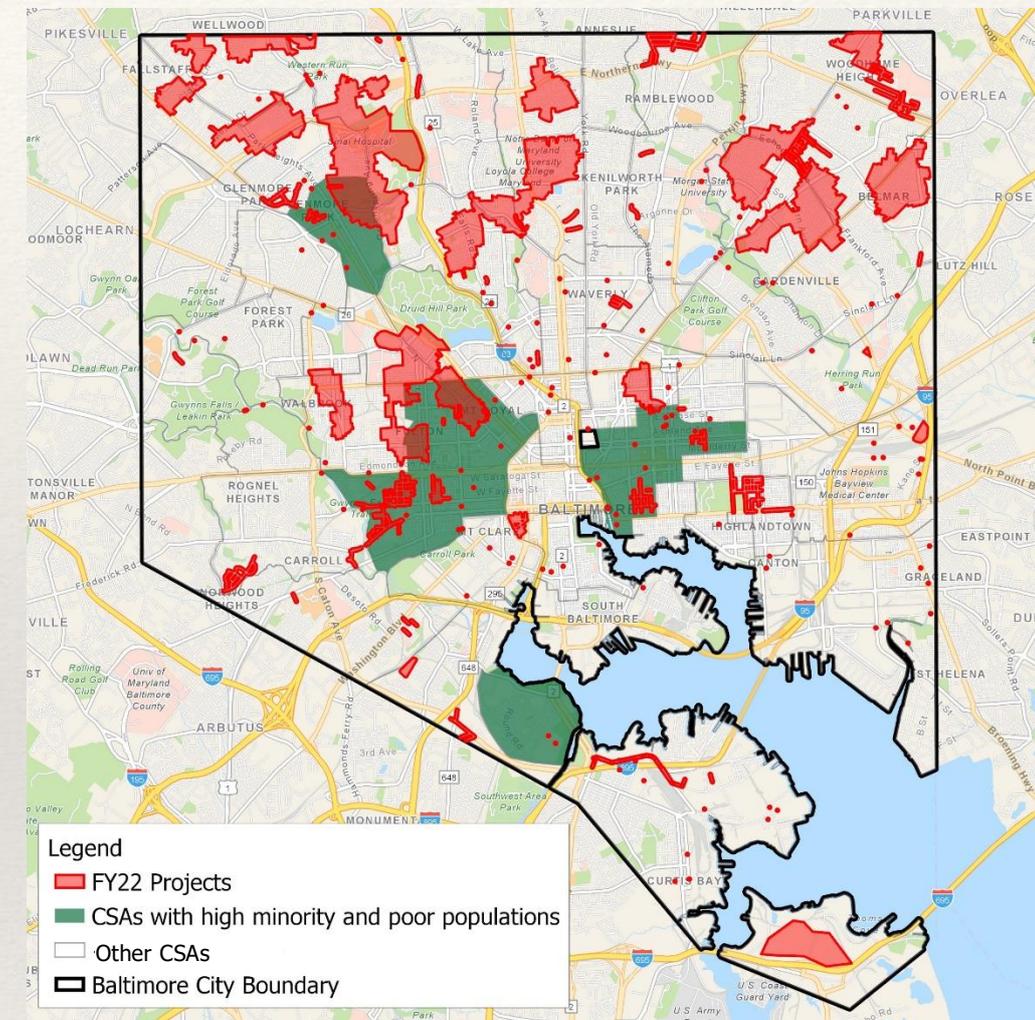
Program Summary



Program Type

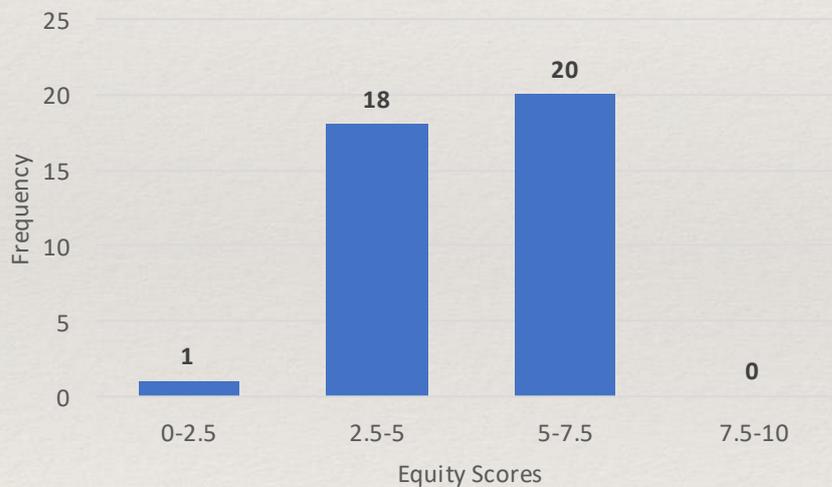
| | |
|----------------|----|
| Drinking Water | 25 |
| Solid Waste | 3 |
| Stormwater | 2 |
| Wastewater | 9 |

Projects in FY22



The map excludes city wide projects

Equity Score



Average Equity Score: 4.8

Average Performance Score: 5.6

Average Combined Score: 5.3

Impacted Areas

8 projects with localized impacts

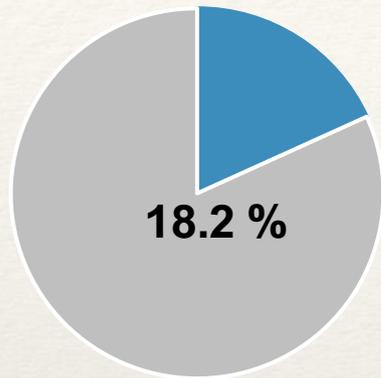
14 projects with impacts on service areas

17 projects with impacts across the city



DPW CIP Program - Equity Scores

Projects with Equity Scores more than 50 percent



4 out of 22* projects have equity scores greater than 5 out of 10

Residents Impacted

- **32%** of total city population ~ 198,053

Vulnerable Populations Impacted

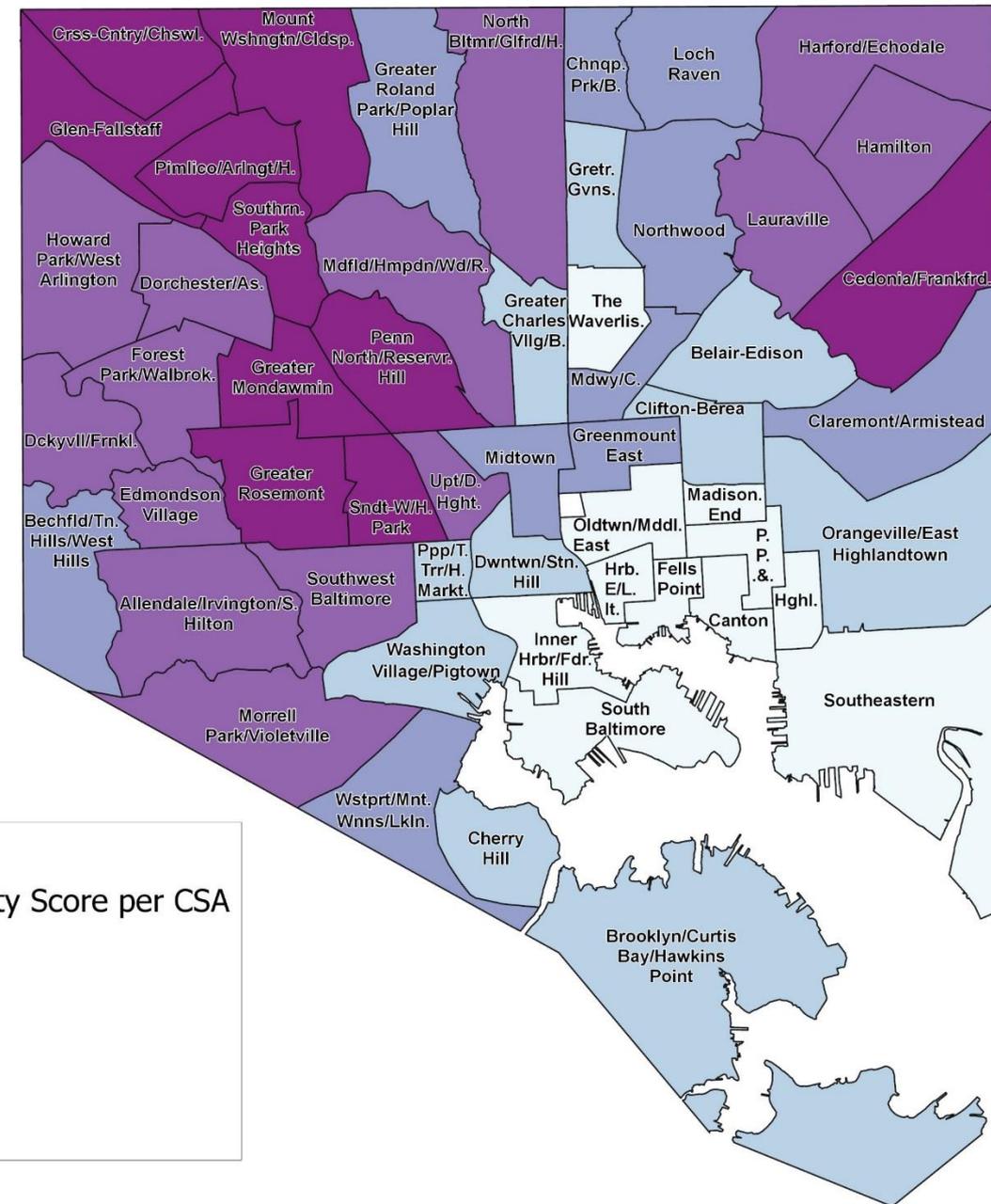
- **16%** of total EJ Population ~ 8,180

Project Costs

- **\$25 million** (10% of total costs)

*excludes 17 citywide projects

Average Equity Score per CSA



FY 2022-2027

Capital Improvement Program Summary

| CIP # | Program | (\$ in Millions) |
|-----------|----------------------------|-------------------|
| 520 & 525 | Stormwater & Environmental | \$ 248 |
| 551 | Wastewater | \$ 1,198 |
| 557 | Water | \$ 666 |

FY 2022 - FY 2027 Total = \$ 2.1 Billion



FY 2022

Capital Improvement Program Summary

| CIP # | Program | (\$ in Millions) |
|-----------|----------------------------|-------------------|
| 520 & 525 | Stormwater & Environmental | \$ 1.5 |
| 551 | Wastewater | \$ 96 |
| 557 | Water | \$ 171 |

FY 2022 Total = \$269 Million



Stormwater & Environmental Programs

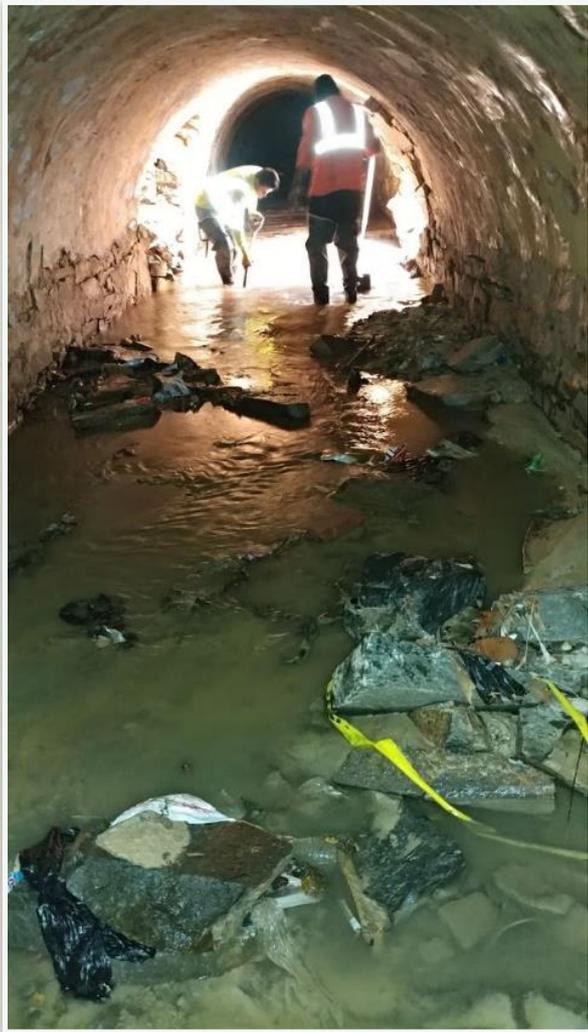
FY 2022 Request

| CIP # | Program | (\$ in Millions) |
|------------------------|-----------------------------------|-----------------------|
| 520-069 | ER-4123 SDC-7769 North Point Road | 0.5 |
| 525-035 | ER -4123 Tree Mitigation | 1.0 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| FY 2021 Total = | | \$ 1.5 Million |



Stormwater Program 520

Long Term Capital Needs



Chronic flooding problems

**Aging Infrastructure
Repair on 66" Storm Drain**



Stormwater Program 520

Recent CIP Accomplishments

SC947 & SC980 - Construction of Twin 10-inch diameter Sewer Main Crossing the Gwynns Fall.



Before



After



Stormwater Program 520

Recent CIP Accomplishments

SC980 - Emergency Repair of 84” Pressure Sewer at Kent Street



Before



After



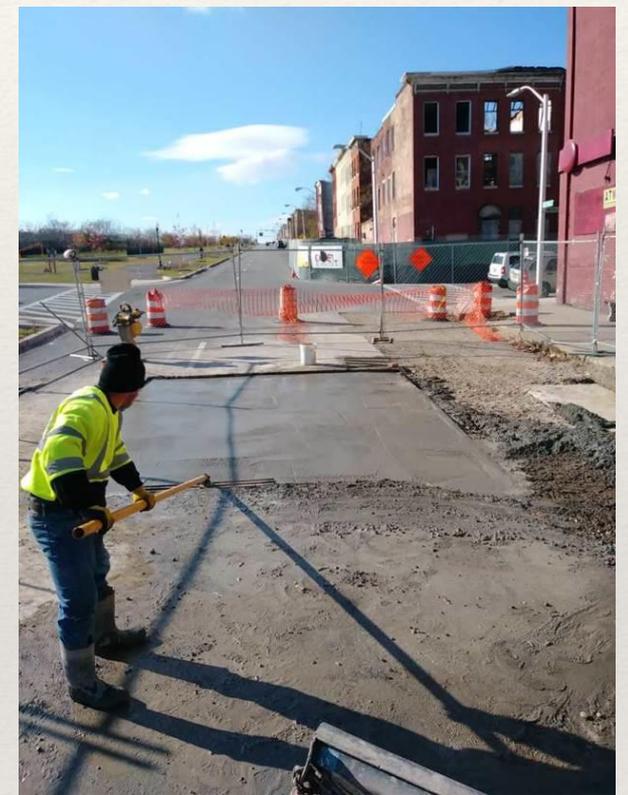
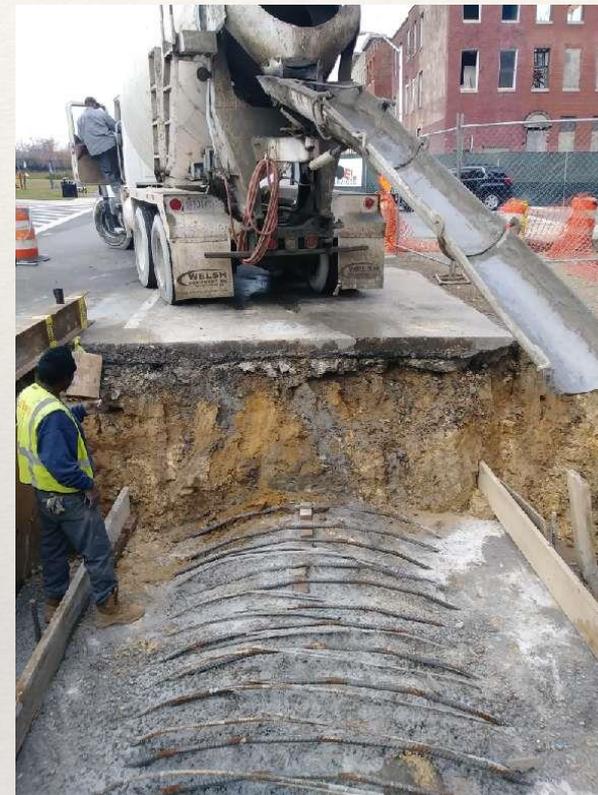
Stormwater Program 520

Recent CIP Accomplishments

Repair of 8' wide x 6' high brick and stone storm drain culver at West Franklin Street



Before



After



Stormwater Program 520

Recent CIP Accomplishments

SDC7777 Jones Falls Drift Catcher Cleaning



Before



After



Stormwater Program 520

Ongoing CIP Accomplishments

SC955 Powder Mill Run Stream Restoration Project



Before



After



Stormwater Program 520

Ongoing CIP Accomplishments

Current Condition
Missing Mortar and Bricks



SDC-7768 Storm drain Design in Harris Creek Watershed - Addressing Structural Deficiencies



Structural Design to Prevent Future Failures



Wastewater Program 551 FY 2022 Utilities Request

| CIP # | Project | (\$ in Millions) |
|----------------|--|-------------------|
| 551-132 | SC-1014 Jones Falls Sewershed Inflow and Infiltration Reduction - Project 01 | \$17.5 |
| 551-609 | SC-866 SW Diversion Pressure Sewer Imp | \$14.4 |
| 551-158 | SC-1017 Inflow and infiltration reduction in various locations in the Baltimore City – Project 01 | \$12.9 |
| 551-115 | SC-1005 Herring Run Sewershed Inflow and Infiltration Reduction - Project 01 | \$4.1 |
| 551-065 | SC-TBD Future Wet Weather Flow Monitoring for PCM | \$3.2 |
| 551-116 | SC-1006 Herring Run Sewershed Inflow and Infiltration Reduction - Project 02 | \$3.0 |
| | Other Utility Projects | \$3.3 |

FY 2022 Total = \$ 58.6 Million



Wastewater Program 551

FY 2022 Facilities Request

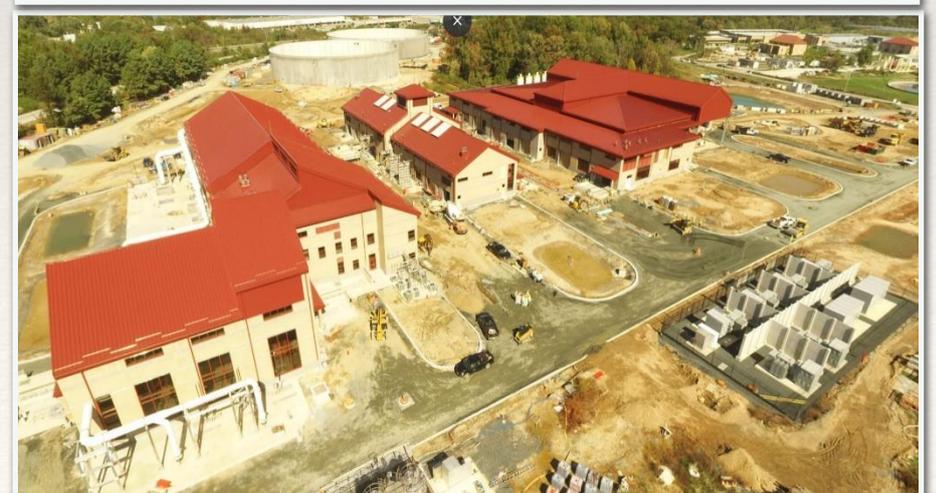
| CIP # | Project | (\$ in Millions) |
|---------------------------------------|--|-------------------|
| 551- 526 | SC 992 Back River Egg-Shaped Digester Rehab. | \$ 37.6 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| FY 2022 Total = \$37.6 Million | | |



Wastewater Program 551

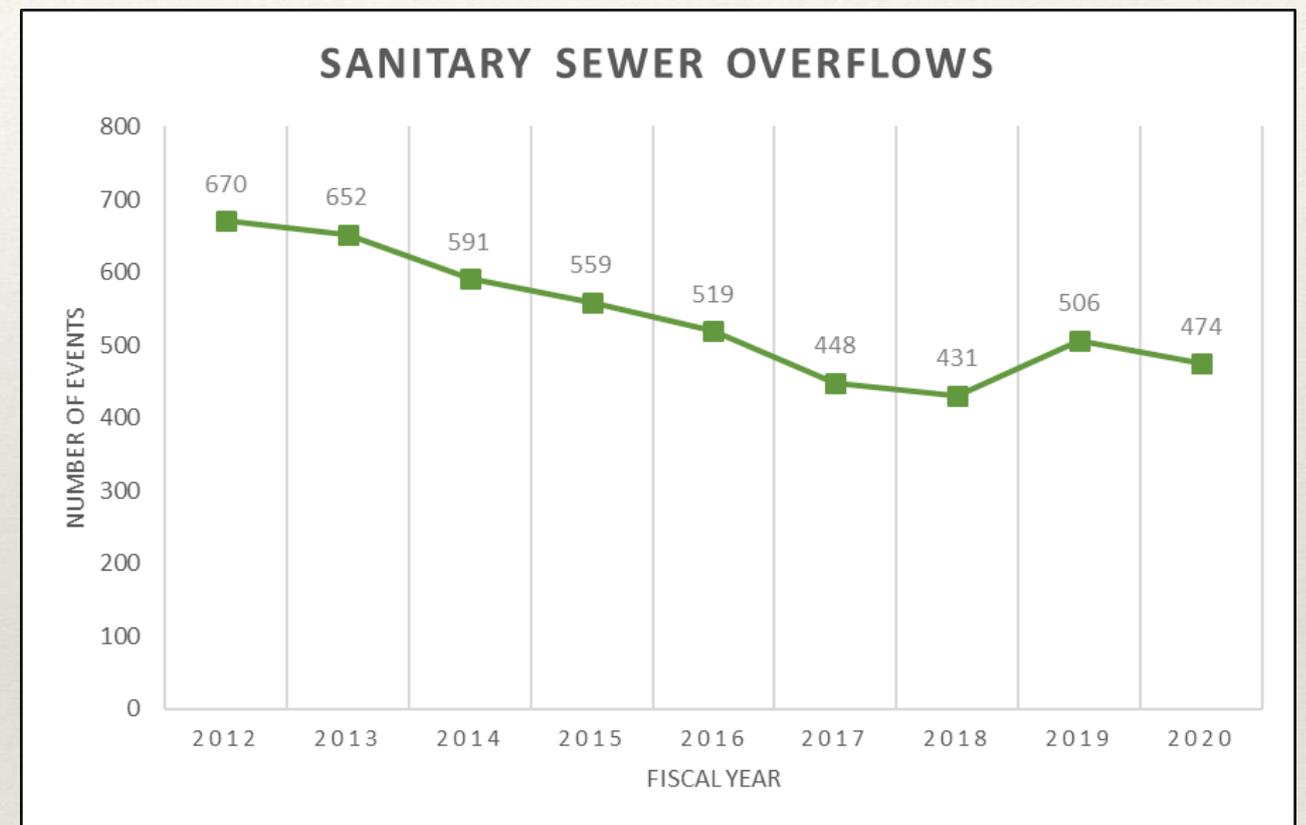
Long Term Capital Needs

- Ongoing Federally mandated Consent Decree Anticipated > \$2.6 Billion cost (FY 2002 through FY 2030).
- Ongoing City support for capital improvements for Power Reliability, Pump Station, WWTP Security, Biosolids Upgrades & Patapsco WWTP Headworks requiring ~ \$0.7 Billion.



Wastewater Program 551 Modified Consent Decree

- Consent Decree entered in September 2002
 - Addresses sanitary sewer overflows (SSOs) from the City's collection system
- Modified Consent Decree was entered in October 2017.
 - The City is doing more
 - The City is working smarter
- Phase I deadline – January 1, 2021
- Phase II deadline – December 31, 2030

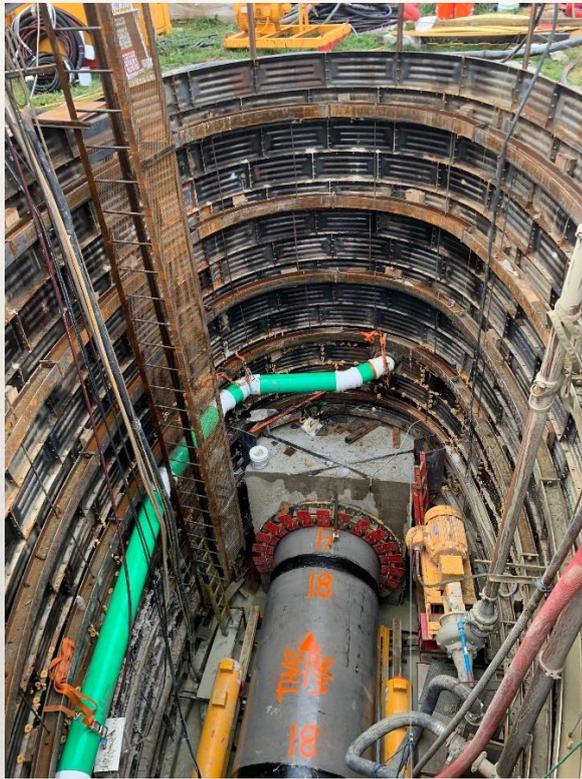


29% decrease from 2012 to 2020!



Wastewater Program 551

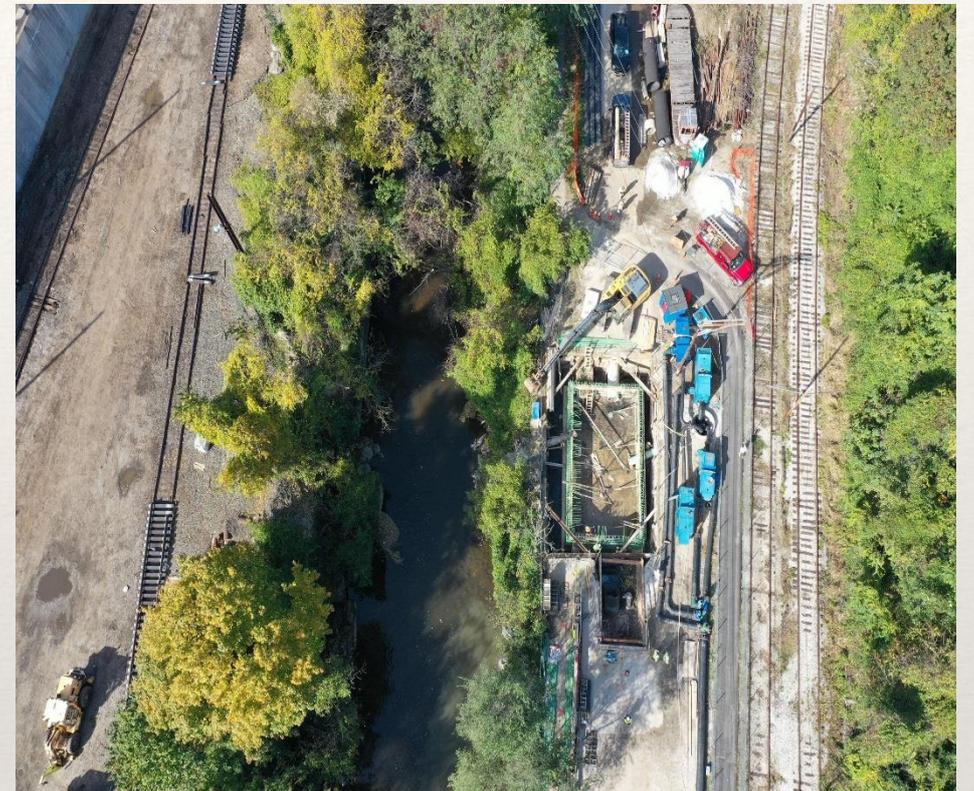
Recent CIP Accomplishments



**Microtunneling across
Liberty Heights Ave**



**Microtunneling across
Perring Parkway**



**Siphon Construction along
Falls Road**

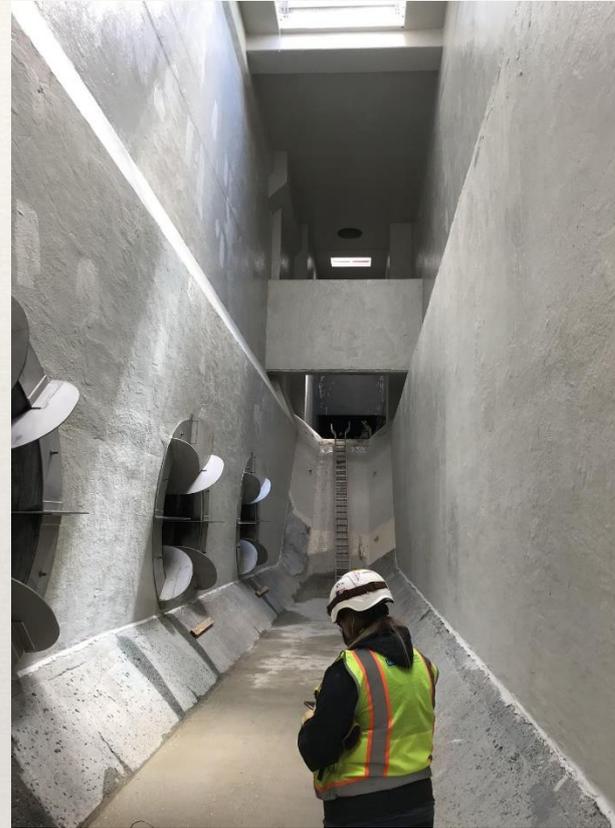


Wastewater Program 551

Recent CIP Accomplishments



**Headworks facility at
BRWWTP**



**Wet well facility at
BRWWTP**



**GRT Facility at
BRWWTP**



Wastewater Program 551

Recent CIP Accomplishments

Back River & Patapsco Projects

- **SC-845R & SC-852R ENR Upgrades**
 - Combined Project Costs ~ \$ 320 Million
 - Patapsco WWTP Construction & Testing complete and meeting NPDES Permit.
- **SC-877 & SC-882 ENR Upgrades**
 - Combined Project Costs ~ \$ 715 Million
 - Back River WWTP Construction 98% complete.
- **SC-918 Headworks & Flow Equalization**
 - Combined Project Costs ~ \$558 Million
 - Back River WWTP Construction 90% complete



Wastewater Program 551

Recent CIP Accomplishments - Utilities

| | | | |
|---------|--------|--------|---------|
| SC 876 | SC 879 | SC 894 | SC 920 |
| SC 897R | SC 898 | SC 899 | SC 902 |
| SC 905 | SC 906 | SC 907 | SC 934 |
| SC 911 | SC 912 | SC 913 | SC 937 |
| SC 931 | SC 932 | SC 933 | SC 922R |
| SC 909 | SC 895 | SC 900 | SC 944R |
| SC 942 | SC 943 | SC 973 | SC 974 |

28 PROJECTS COMPLETED
\$404 million

| | | | |
|--------|--------|--------|---------|
| SC 903 | SC 941 | SC 964 | |
| SC 910 | SC 953 | SC 965 | |
| SC 914 | SC 955 | SC 967 | |
| SC 919 | SC 956 | SC 968 | |
| SC 921 | SC 962 | SC 976 | |
| SC 940 | SC 963 | SC 977 | |
| SC 997 | SC 998 | SC 999 | SC 1000 |

22 CONSTRUCTION PROJECTS
\$384 million

| | | |
|---------|---------|--------|
| SC 1006 | SC 1010 | SC 978 |
| SC 1005 | SC 1012 | SC 969 |
| SC 1014 | SC 1006 | SC 946 |
| SC 1017 | SC 1007 | SC 945 |
| SC 866 | SC 1008 | SC 985 |
| | SC 1009 | |

FY 22 REQUEST
\$211 million

DESIGN PROJECTS
\$130 million



Wastewater Program 551

Recent CIP Accomplishments - Facilities

| | | | |
|---------|---------|---------|---------|
| SC 829 | SC 841 | SC 846 | SC 847 |
| SC 848 | SC 8526 | SC 854 | SC 855 |
| SC 857 | SC 859 | SC 863 | SC 868 |
| SC 869 | SC 870 | SC 884 | SC 886R |
| SC 888 | SC 889 | SC 901R | SC 915 |
| SC 918S | SC 923 | SC 924 | SC 961 |

24 PROJECTS COMPLETED
\$47 Million

| | | |
|---------|---------|---------|
| SC 845R | SC 852R | SC 877 |
| SC 882 | SC 890 | SC 892R |
| SC 918H | SC 925 | SC 948 |
| SC 927 | SC 961 | |

11 CONSTRUCTION PROJECTS
\$1.426 Billion

SC 992

FY 22 REQUEST
\$38 million

| | | |
|--------|--------|--------|
| SC 926 | SC 930 | SC 935 |
| SC 938 | SC 948 | SC 949 |
| SC 950 | SC 951 | SC 954 |
| SC 957 | SC 982 | SC 983 |
| SC 987 | SC 988 | SC 989 |
| SC 990 | SC 991 | SC 993 |
| | SC 994 | SC 995 |

20 STUDY/DESIGN PROJECTS
\$563 Million



Water Program 557

FY 2022 Utilities Requests

| CIP # | Project | (\$ in Millions) |
|--|--|------------------|
| 557-175 | WC-1282 Water Main Rehab at Franklin Square | 14.9 |
| 557-126 | WC-1283 Water Main Rehab at Reistertown Road | 12.6 |
| 557-074 | WC-1258 Water Main Rehab at Lambeth Road | 10.9 |
| 557-233 | Urgent Need Infrastructure Rehab FY 22 Phase I | 10.2 |
| 557-234 | Urgent Need Infrastructure Rehab FY 22 Phase II | 10.2 |
| 557-235 | Urgent Need Infrastructure Rehab FY 22 Phase III | 10.2 |
| | Other Water Utility Projects | 22.5 |
| FY 2022 Utilities Total = \$ 91.5 Million | | |



Water Program 557

FY 2022 Facilities Requests

| CIP # | Project | (\$ in Millions) |
|---------------------------------|---|--------------------------|
| 557-051 | WC-1413 Montebello Lake Dredging | 23.3 |
| 557-036 | WC-1327 Chlorine Handling Safety Improv. | 18.4 |
| 557-139 | WC-1384 Earthen Dam Rehabilitation | 10.8 |
| 557-011 | Washington Blvd Pump Station Rehabilitation | 7.7 |
| 557-036 | Curtis Bay Tank Rehabilitation | 7.2 |
| | Other Water Facility Projects | 12.7 |
| FY 2022 Facilities Total | | = \$ 80.2 Million |



Water Program 557

Long Term Capital Needs

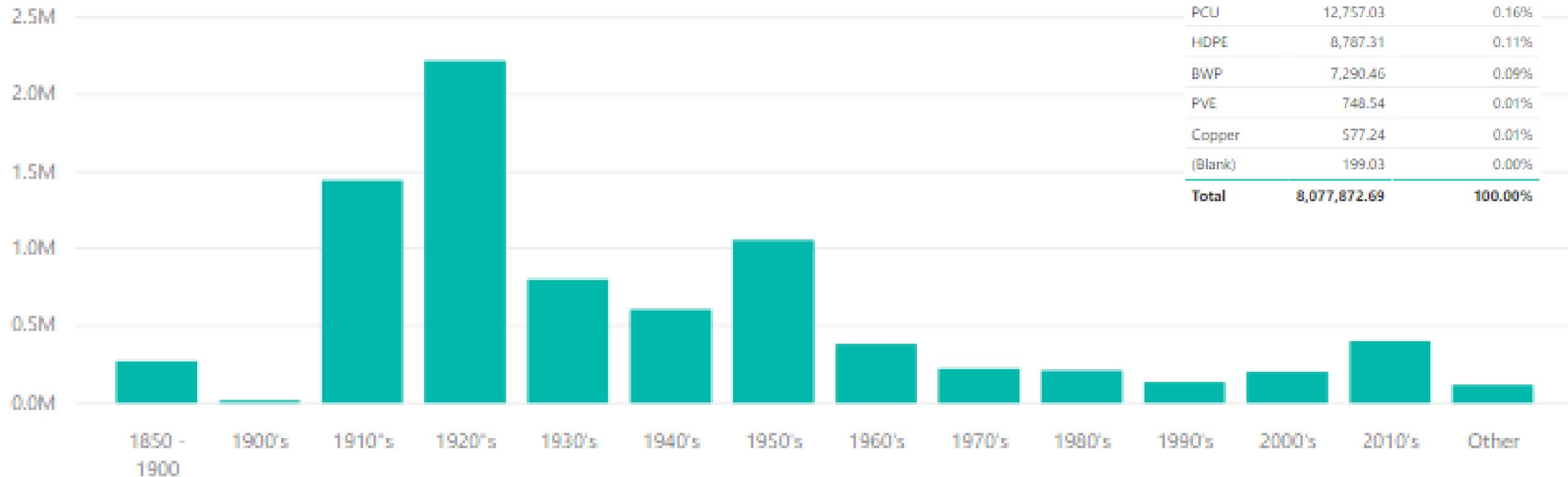
Average Age of Water Main Assets

Approximately 80 Years

Length of Active Baltimore City Water Mains Installed by Decade
Average Age is Approximately 80 Years Old

| Material Type | Length | % of Length to Total |
|---------------|---------------------|----------------------|
| Cast Iron | 6,833,836.49 | 84.60% |
| Ductile Iron | 846,358.00 | 10.48% |
| Concrete | 314,745.84 | 3.90% |
| Steel | 30,838.67 | 0.38% |
| Unknown | 21,734.09 | 0.27% |
| PCU | 12,757.03 | 0.16% |
| HDPE | 8,787.31 | 0.11% |
| BWP | 7,290.46 | 0.09% |
| PVE | 748.54 | 0.01% |
| Copper | 577.24 | 0.01% |
| (Blank) | 199.03 | 0.00% |
| Total | 8,077,872.69 | 100.00% |

Water Main Installation by Decade



Water Program 557

Long Term Capital Needs



Water Program 557

Long Term Capital Needs

Montebello WFP 1 & 2 Renovations

Mechanical/Structural/Electrical/Controls/Filter Upgrade Work
Appropriations > \$ 125 Million



Hydraulic Valve Actuator
Corroded Leakage



Ground Water Leakage



Existing Filter Piping
Conditions



Water Program 557

Recent CIP Accomplishments - Utilities

| | | | | |
|---------|-----------|---------|---------|-----------|
| WC 1202 | WC 1203 | WC 1217 | WC 1224 | WC 1225 R |
| WC 1226 | WC 1234 | WC 1240 | WC 1244 | WC 1245 |
| WC 1246 | WC 1254 R | WC 1255 | WC 1256 | WC 1260 |
| WC 1261 | WC 1262 | WC 1263 | WC 1264 | WC 1266 R |
| WC 1268 | WC 1269 | WC 1270 | WC 1276 | WC 1278 |
| WC 1294 | WC 1330 | WC 1337 | WC 1342 | WC 1343 |
| WC 1346 | WC 1351 | WC 1355 | WC 1359 | WC 1366 |
| WC 1369 | WC 1302 | | | |

37 PROJECTS COMPLETED

\$160 Million

| | |
|---------|-----------|
| WC 1272 | WC 1286 |
| WC 1293 | WC 1301 R |
| WC 1302 | WC 1314 |
| WC 1339 | WC 1340 |
| WC 1363 | WC 1365 |
| WC 1406 | |

11 CONSTRUCTION PROJECTS

\$94 Million

| | | | | | |
|---------|---------|---------|---------|---------|---------|
| WC-1258 | WC-1418 | WC 1241 | WC 1252 | WC 1257 | |
| WC-1282 | WC-TBD | WC 1271 | WC 1274 | WC 1275 | |
| WC-1283 | WC-TBD | WC 1277 | WC 1279 | WC 1281 | |
| WC-1349 | WC-TBD | WC 1284 | WC 1285 | WC 1287 | |
| WC-1416 | WC-TBD | WC 1288 | WC 1290 | WC 1291 | |
| WC-1417 | WC-TBD | WC 1292 | WC 1312 | WC 1313 | |
| WC-TBD | WC-TBD | WC 1315 | WC 1316 | WC 1317 | WC 1318 |
| WC-TBD | WC-TBD | WC 1320 | WC 1321 | WC 1367 | WC 1391 |

FY 22 REQUEST

42 DESIGN PROJECTS

\$367 Million



Water Program 557

Recent CIP Accomplishments - Facilities

| | | | |
|-----------|---------|-----------|---------|
| WC 1137 R | WC 1143 | WC 1160 R | WC 1164 |
| WC 1168 | WC 1178 | WC 1183 | WC 1194 |
| WC 1228 R | WC 1233 | WC 1242 | WC 1295 |
| WC 1306 | WC 7607 | WC 8652 | WC 1190 |
| WC 1230 | WC 1362 | | |

| | | |
|---------|---------|---------|
| WC 1120 | WC 1173 | |
| WC 1204 | WC 1211 | WC 1228 |
| WC 1305 | WC 1328 | |

| | | | |
|---------|---------|----------|------------|
| WC 1327 | WC 1376 | TR 11003 | TR 11013 R |
| WC 1380 | WC 1382 | WC 1199 | WC 1207 |
| WC 1384 | WC 1395 | WC 1229 | WC 1243 |
| WC 1413 | WC TBD | WC 1326 | WC 1396 |
| WC TBD | | WC 1397 | WC 1406 |

FY 22 REQUEST

18 PROJECTS COMPLETED
\$130 Million

7 CONSTRUCTION PROJECTS
\$515 Million

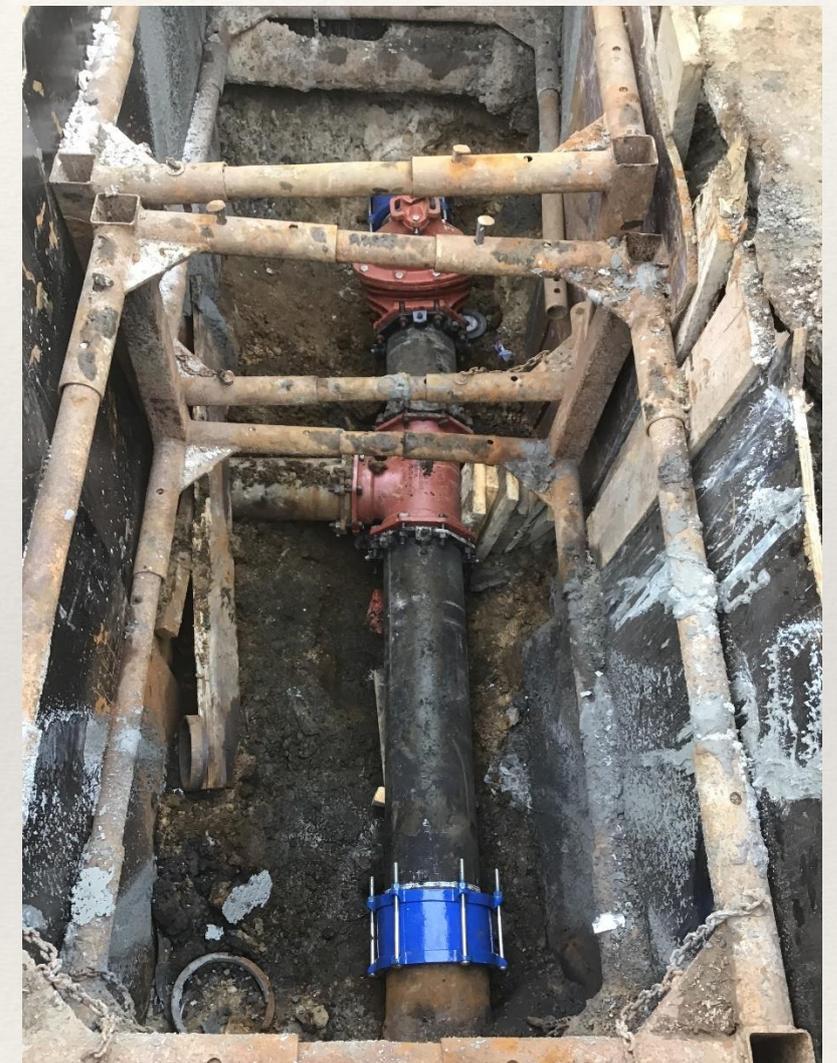
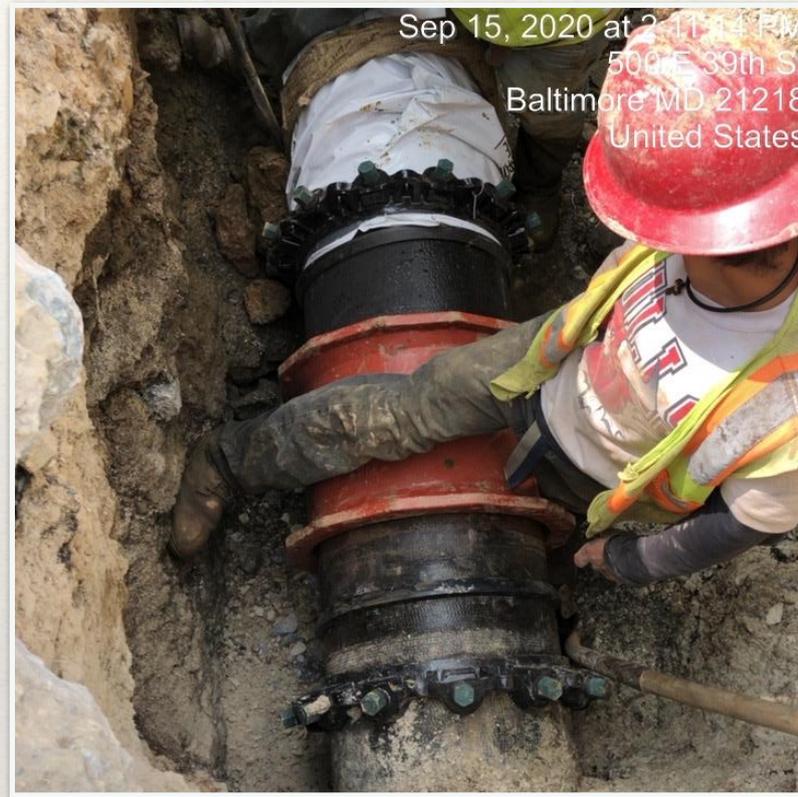
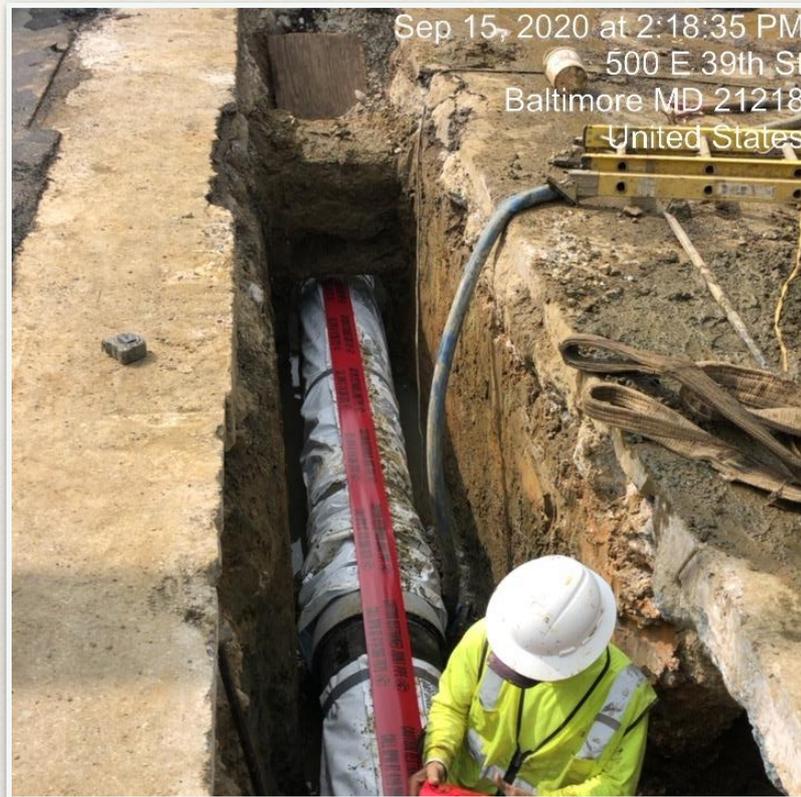
19 DESIGN PROJECTS
\$318 Million



Water Program 557

Recent CIP Accomplishments - Utilities

16" DIP water main replacement at E. 39th St. under WC-1407



DIP water main replacement on W. Hoffman St. and Druid Hill Ave. under WC-1339



Water Program 557

Recent CIP Accomplishments - Utilities

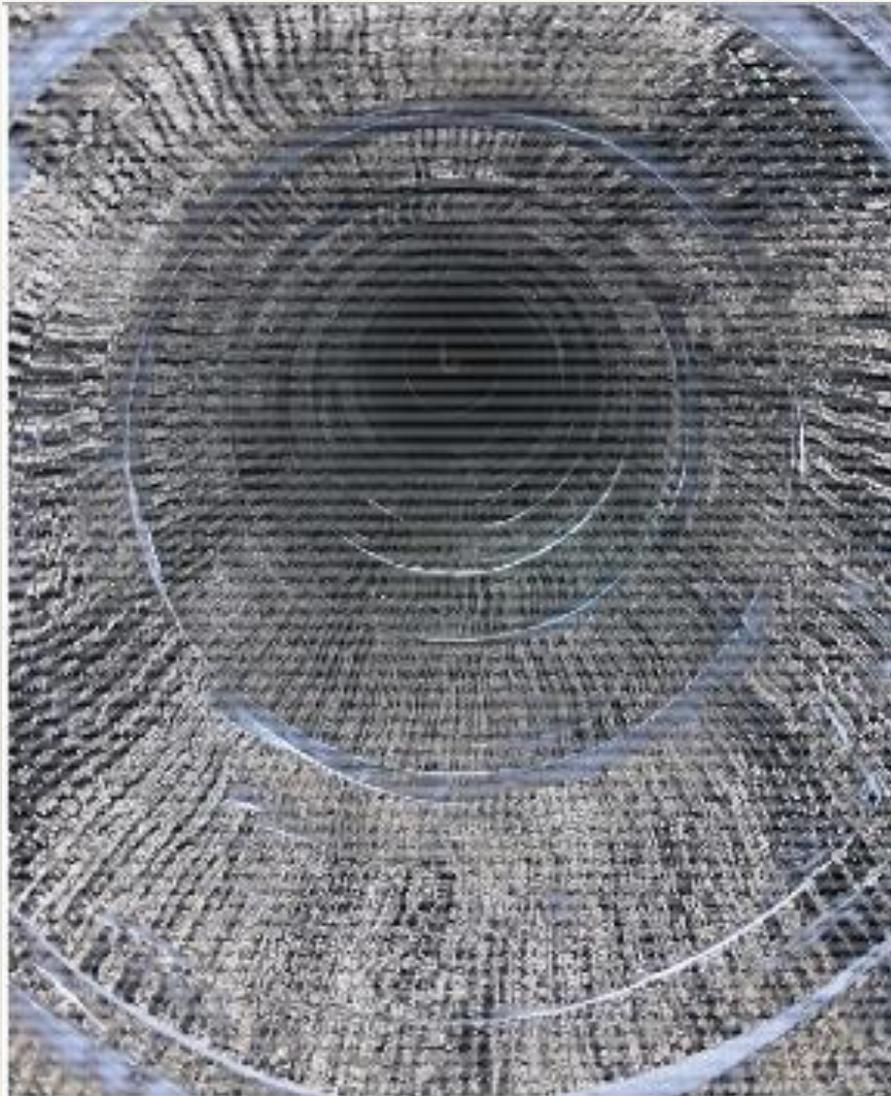


Figure 1 - First Cured Layer of CFRP.



Figure 1 - Second Cured Layer of CFRP.

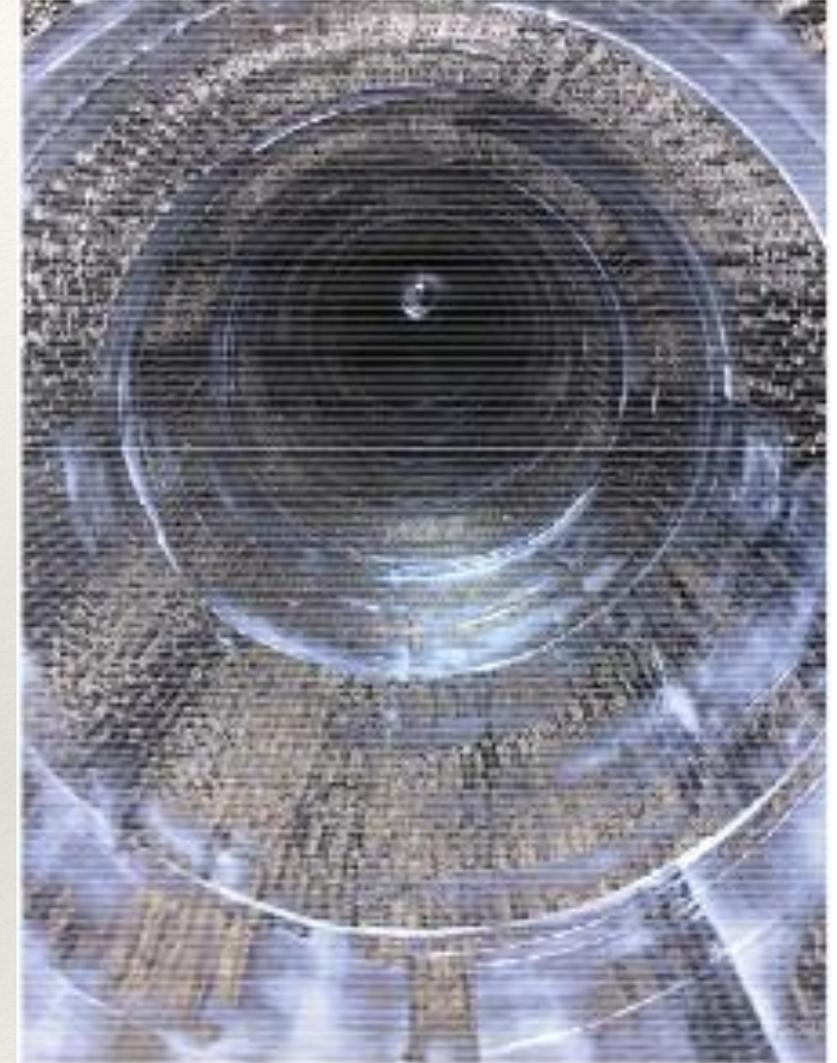


Figure 1 - Final Cured Layer of CFRP.



Proactive Internal Carbon-Fiber Repair of 36" PCCP



Water Program 557

Recent CIP Accomplishments - Facilities

**WC 1173R Guilford Finished Water Reservoir Project Costs ~ \$ 70 Million
Construction at 95% Complete**



**WC 1204 Druid Lake Finished Water Reservoir
Project Costs ~ \$212 Million
Construction at 90% Complete**



**WC 1211 Ashburton Lake Finished Water Reservoir
Project Costs ~ \$178 Million
Construction at 35% Complete**





FY 2022 Capital Improvement Program Presentation



Questions?

